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The war on white pine blister rust in the
Inland Empire.

U.S.D.A., Forest Service and Bureau of
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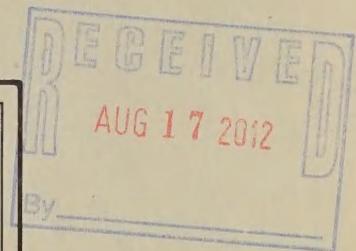
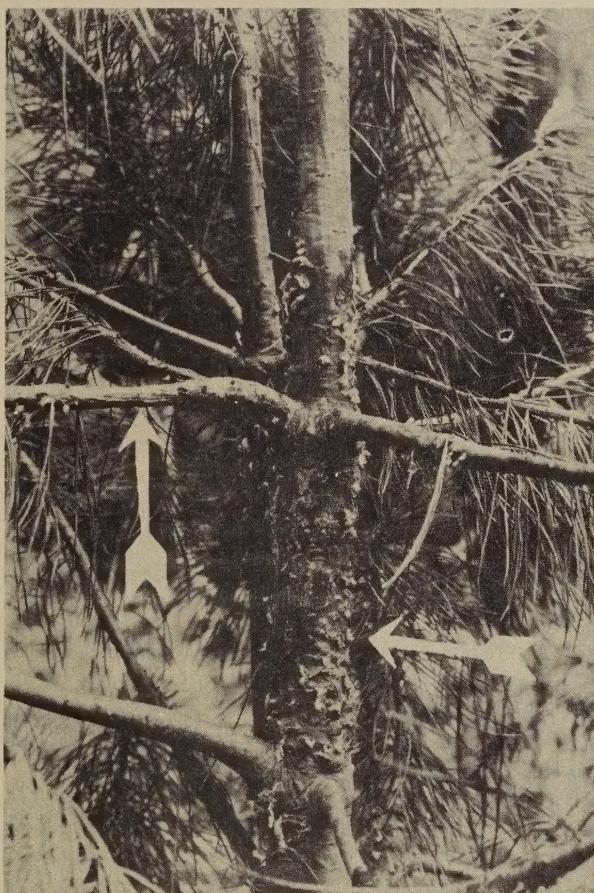
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THE WAR ON WHITE PINE BLISTER RUST IN THE INLAND EMPIRE



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U.S. DEPARTMENT OF AGRICULTURE
BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE, SPOKANE, WASH.
FOREST SERVICE, MISSOULA, MONT.





THE FUTURE OF THE LUMBER INDUSTRY IN THE INLAND EMPIRE
DEPENDS ON SAVING SUCH YOUNG PINES FROM BLISTER RUST.



RIBES MUST BE ERADICATED ON 2,670,000 ACRES.

JOBS OR BLISTER RUST

The destruction of a great national resource is threatened in North Idaho and the adjacent territory in Washington and Montana. It is a resource upon which depends the future jobs of thousands of men and the prosperity of thriving communities.

White pine blister rust threatens to eliminate an industry that now employs upwards of 5,000 men and pays more than \$7,000,000 annually in wages.

Ten large sawmills and several smaller ones are dependent on white pine for their operations. They can continue to operate for a time on the present supply of merchantable-sized timber. But unless the spread of blister rust infection is stopped, the young growth of white pine will be destroyed by the disease and the industry will gradually disappear.

In waging a war against blister rust, the men in the CCC camps are defending the homes and communities of the Inland Empire. It is not a spectacular battle with booming guns, whine of bullets, or zoom of airplanes. Nor is it rewarded with banner headlines in the daily press like those that stream across the pages when billowing clouds of smoke and leaping flames sweep through the forests.

But the fight is real. The foe is as relentless as any that man must conquer. Blister rust is perhaps even more dangerous to the welfare of the country than fire or flood because of its very nature. It feeds slowly and, like cancer in the human body, gradually saps the life of its victims. Consequently, those whose welfare is threatened may not fully realize the danger.

Fortunately this fight can be won. Where ribes has been eradicated, the progress of infection by blister rust has been definitely stopped. But it takes men, money, and determination. The best defense is attack, and the purpose of this pamphlet is to arouse an appreciation and understanding of the realities of the situation.

WHITE PINE BLISTER RUST IN THE INLAND EMPIRE

Prepared by The
Forest Service, Missoula, Montana,
and The

Bureau of Entomology and Plant Quarantine, Spokane, Washington.

April 14, 1939.

1. Q. What is white pine blister rust?

A. It is a plant parasite (fungous disease) which attacks the white or 5-needed pines and spreads on alternate host plants, currant and gooseberry bushes. Currant and gooseberries are known in control work under the general term "ribes."

2. Q. Does the disease attack other plants?

A. No, it attacks only white pines and ribes.

3. Q. How does it affect the white pine?

A. It kills the white pine. The disease enters the pine through the needles and grows in the inner bark. From one to three years after infection it becomes visible as a reddish-brown discoloration of the bark accompanied by a slight swelling. After one or two years' additional development small whitish sacs burst through the diseased bark in the spring of each year. These sacs break open, liberating an orange-colored rust which consists of millions of tiny spores or seedlike bodies which are scattered by the wind to infect ribes. The canker continues to develop and will fruit or produce spores until the tree has been killed by girdling.

4. Q. How does the disease appear on the ribes?

A. The rust appears in the spring and early summer as orange-colored spots on the lower surface of the leaf. Spores produced at this stage cannot infect the pines but can cause additional infection on the leaf or spread the disease from leaf to leaf and bush to nearby bush. During the summer and fall small hairlike structures grow from the diseased area on the leaf. These hairlike columns produce the pine-infecting spores. At this stage the infection is dark brown in color.

5. Q. Can the disease spread from pine to pine?

A. No. It can spread only on ribes. It is impossible for the spores produced on infected pines to infect other pines. These spores can infect only the ribes and no other types or species of plant. The summer and fall spores produced on infected ribes can infect only the 5-needed or white pines.

6. Q. What is the distinguishing characteristic of the white pines?

A. White pines have five needles growing in a bundle. The yellow or ponderosa pine has three needles; the lodgepole or jack pine, two needles in a bundle.

7. Q. What is the agency which spreads the disease?

A. The spores are carried by the wind. Any spread by birds and rodents is negligible in comparison.

8. Q. Where did the disease originate?

A. It is believed to have originated on the stone pine (Pinus cembra) in Asia.

9. Q. Where was the disease first discovered?

A. It was discovered in 1854 on both pine and ribes in the northern part of European Russia.

10. Q. Has it done much damage in Europe?

A. It has spread through all of the white pine stands in western Europe and has done so much damage that reforestation with white pine has been discontinued. The presence of this disease in any white pine region will make it impossible to grow these trees without protection measures.

11. Q. When was the disease introduced into the United States?

A. About 1898 when the importation of nursery stock from Europe was started. Some of this stock was diseased, and in this way the rust was introduced into the northeastern part of the United States.

12. Q. Did the disease spread to the West from the eastern infection centers?

A. No. It was accidentally introduced at Vancouver, B.C., in 1910 on nursery stock imported from France.

13. Q. When did the disease come into the Inland Empire?

A. It became established in the white pine belt of the Inland Empire in 1923 at 15 known locations. It was not discovered until the fall of 1927 when it was found on ribes on the Kaniksu National Forest. It was located on pine at Newman Lake, Washington, in May 1928. It is now generally distributed throughout the white pine belt and eastward as far as Glacier and Yellowstone National Parks.

14. Q. How far south has the rust spread?

A. From Vancouver, B.C., it has spread south through the coastal region of Washington and Oregon and for 160 miles into California. It is still in the introductory stage in California, having been found there for the first time in 1936.

15. Q. Were any measures taken to prevent its rapid spread to the commercial white pine belts?

A. Yes. These delay measures were twofold:

- (1) Quarantine laws were enforced prohibiting the shipment of pines and ribes from infected to noninfected areas.
- (2) Following the discovery of the rust in the West, cultivated black currant bushes, the most dangerous alternate host, were eradicated from Montana, Idaho, Washington, Oregon, and California.

16. Q. Were these delay measures effective?

A. Yes. The quarantine laws insure that infected host plants will not be shipped to disease-free areas. These laws are still being enforced. The eradication of the European or cultivated black currant has undoubtedly helped to delay the rapid spread of the disease. This species of currant is the most susceptible to the rust and becomes infected from long-distance spread. In 1917, for example, the rust spread from infected pines on the coast to cultivated black currants at Revelstoke on the Columbia River in the interior of British Columbia.

17. Q. How far will the disease spread?

A. From pine to ribes it can spread 200 miles or more. From ribes to pine, however, it can spread only a few hundred yards. The difference is due to a difference in the spores, those produced on the pines being tough and long-lived, while those originating on the ribes are fragile and short-lived.

18. Q. Can blister rust be controlled?

A. Yes. As it can spread only on ribes, control of this disease is possible by elimination of the ribes. On account of the very short distance spread from ribes to pine, protection work can be concentrated on pine areas which bear or will bear the more valuable stands of pine. With the eradication of ribes from within and around these areas of pine, the trees are protected from blister rust.

19. Q. How are the ribes eradicated?

A. The bushes growing on the hillsides, away from streams or, in other words, in the upland areas, are pulled by hand or with

the aid of a pick or grub hoe. The bushes are placed on stumps, logs, or brush to dry out and die. The larger bushes not readily pulled by hand and those under logs or growing in rocks are killed by cutting away the branches and part of the root crown, and applying a small quantity of chemical or Diesel oil to the mutilated crown.

The wild black currant, which grows abundantly along streams and in swampy areas, is eradicated by spraying with chemicals. Stream or swamp areas on which there is dense brush, including large numbers of white-stemmed gooseberry bushes per acre, are cleared with a bulldozer or caterpillar tractor equipped with a special blade for uprooting brush. Less extensive areas of heavy brush which interfere with hand pulling of the white-stemmed gooseberry are cleared by hand slashing, men cutting the brush and pulling the ribs by hand as the brush is cleared away. This method is expensive and is used only when no other method will result in satisfactory eradication work.

20. Q. Are white pines of commercial value in the West?

A. The white pines are the most valuable forest trees in the West. The principal commercial species are the western white pine (Pinus monticola) found in the Inland Empire and the Cascade Mountains of Washington and Oregon, and the sugar pine (P. lambertiana) found in southern Oregon and California. The limber pine (P. flexilis), the white bark pine (P. albicaulis), and the bristle-cone pine (P. aristata), generally high-altitude species, have little commercial value but are of considerable importance for watershed protection, soil conservation and recreational use.

21. Q. How many acres of white pine type are there in the Inland Empire?

A. The control area includes 2,670,405 acres. This includes the principal white pine areas, though there are additional patches and stringers of white pine which cannot be economically protected.

22. Q. What progress has been made in protecting the white pine from blister rust in the Inland Empire?

A. The first working has been completed on about two-thirds of the control area. Much of this will require a second or third working in order to maintain protection. The following table shows the ownership of white pine areas and the progress of first working:

Progress of First Working by Ownership Classes

<u>Ownership</u>	<u>Acres Worked</u>	<u>Acres Unworked</u>	<u>Total Acres</u>
National Forest..	967,838	419,812	1,387,650
Public Domain....	16,134	15,931	32,065
State.....	259,286	97,334	356,620
Private.....	<u>539,099</u>	<u>354,971</u>	<u>894,070</u>
Total.....	1,782,357	888,048	2,670,405

23. Q. Why are second and third workings necessary?

A. In order to answer this question, it is necessary to explain the life history of ribes in timber stands. As the timber matures, these bushes are gradually shaded out. They have dropped seeds which lie dormant in the duff and germinate or start to grow when the forest shade is removed and the ground disturbed by logging or fire. For some time the bushes are on the increase; then for a period they neither increase nor decrease in numbers, being more or less in equilibrium; then as the timber canopy closes in, they are definitely on the decrease.

In areas where the ribes are on the decrease one working is sufficient to protect the pine, in areas where the ribes are in general neither increasing nor decreasing two workings are sometimes necessary, and in areas where the ribes are on the increase three workings may be necessary.

24. Q. Has anything been done to eradicate the disease from infected trees?

A. No. It takes from one to three years for infection to become visible on the pine. If the visible cankers were cut out, there would probably be other cankers developing on the trees. It is better to let the infected trees go and protect the healthy pines by eradicating the disease carriers, ribes.

25. Q. How much merchantable white pine timber is there in the Inland Empire?

A. According to the best estimates there are 1,007 million board feet in Montana, 9,852 million in Idaho, 469 million in eastern Washington, or a total of 11,328 million. A little over one-third of this is national forest timber.

26. Q. What is the stumpage value of this timber?

A. For current operations, white pine stumpage usually sells for from \$4.00 to \$10.00 per thousand board feet. At an average value of \$6.00 per thousand, the white pine stumpage in the Inland Empire would be worth \$68,000,000.

27. Q. Is white pine important to the lumber industry of the Inland Empire?

A. A large part of the industry is based on white pine. This is particularly true of North Idaho. In 1937 the total cut in North Idaho was 629 million feet, of which 460 million, or 73%, was white pine. Without white pine the major lumber industry of the Inland Empire white pine zone would largely disappear, since the value and merchantability of other species would not support the industry on anything like the present scale.

28. Q. What is the value of the white pine lumber cut of the Inland Empire?

A. The average annual lumber cut is about 500 million feet, with a sale value of \$16,000,000.

29. Q. What does this mean in employment and wages?

A. It is estimated that, on the basis of the average annual cut of white pine from 1933 to 1937, the white pine industry created 63,000 man-months of employment each year, and paid \$7,355,000 annually in wages. There are ten large sawmills in Idaho and eastern Washington, besides several smaller mills which are primarily dependent on white pine for their operation.

30. Q. Will protection of white pine from blister rust make it possible to continue the present white pine industry?

A. White pine in the Inland Empire is being cut more rapidly than it is being replaced by annual growth. There will be a period of reduction under the present cut, but eventually the 2,670,000 acres within the blister rust control units has the capacity of producing over 300 million feet of white pine a year, with a lumber value of \$10,000,000 annually.

31. Q. Would this industry disappear if blister rust control were abandoned?

A. Most of the present merchantable-sized timber could probably be salvaged before it was killed, though some loss might be expected. Most of the young growth of white pine would be destroyed by the disease and the white pine industry of the Inland Empire would gradually disappear.

32. Q. Have control measures been demonstrated to be successful?

A. Yes. On the areas on which ribes were eradicated in the earlier work in the Inland Empire, careful checks have indicated that the progress of infection by blister rust has been definitely stopped.

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